A STUDY OF DIET AND INSULIN IN GESTATIONAL DIABETES MELLITUS WITH SPECIAL REFERENCE TO RANCHI TOWN

A SYNOPSIS/RESEARCH PROPOSAL

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❖ ***State-of-the-Art***:

Gestational Diabetes Mellitus (GDM) is a condition in which a hormone made by placenta prevents the body from using insulin effectively. Glucose builds up in the blood instead of being absorbed by the cells.

The placenta supplies a growing fetus with nutrients and water, and also produces a variety of hormones (estrogen, cortisol and human placental lactogen) can have a blocking effect of insulin, which usually begins about 20-24 weeks of pregnancy. As the placenta grows, more of these hormones are produced, and the risk of insulin to overcome insulin resistance.

Unlike Type 1 Diabetes, Gestational Diabetes Mellitus is not caused by lack of insulin, but by other hormones produced during pregnancy that can make insulin less effective.

Generally Gestational Diabetic Symptoms disappear following delivery.

The researcher randomly assigned patients with Gestational Diabetes Mellitus to study their lifestyle management followed by them. Unless women with Gestational Diabetes Mellitus does not follow the correct eating, habits there are chances that they can turn into Type II diabetes in sooner future.

A proper diabetic diet can be prescribed to the Gestational Diabetes Mellitus women which will include reduced intake of high sugar foods, high caloric food, fatty meats and sweetened beverages. However, continued intake of complex carbohydrates, green vegetables, whole grains and a good number of dry fruits is advised for good fats.

GDM is not only associated with adverse pregnancy outcomes, such as macrosomia, increased caesarean section rates, hypertensive disorders and foetal hyperinsulinemia, but also significantly increases the risk for long-term problems for both mothers and their offspring.

Women who have had GDM have a substantially increased risk for development of T2DM, even though most women return to a euglycemic state shortly after delivery. The evidence of this association is massive, but the magnitude of the risk varies among studies.

State of the art is a crucial aspect in planning of new study.

- **Ann Nutr Metab - (2015)** Summarized in his study that fatal macrosomia is a common adverse infant outcome of GDM if unrecognized and untreated in time. For the infant, macrosomia increases the risk of shoulder fractures and brachial plecures injury and increases the rate of admissions to the neonatal intensive care unit. For the mother the risks associated with macrosomia are cesarean delivery post partem hemorrhage.

- **Han S. – (2017)** - Evidence from 19 trials assessing different types of dietary advice for women with GDM suggests no clear differences for primary outcomes and secondary outcomes using GRADE, except for a possible caesarean for women

receiving a DASH diet compared with a control diet. Few differences were observed for secondary outcomes. Dietary advice is the main strategy for managing Gestational diabetes mellitus.

- **Julie Brown – (2017) -** The main comparison in this review is insulin versus antidiabetic pharmacological therapies. These both have similar effects on key health outcomes. Long term maternal and neonatal outcomes were poorly reported for all comparisons. The choice to use one or the other may be down to physician or material preferences or severity of GDM.

- **Emily Shepherd – (2017) –** The compared study combined diet and exercises programs evaluated and health outcomes reported. For our primary review outcomes, there was a possible reduced risk of GDM in the diet and exercise intervention group compared. Moderate quality evidence suggests reduced risk of GDM with combined diet and exercise.

- **Ruth Martin Et Al – (2018) –** Conducted their research on insufficient high-quality evidence about the effects on health outcomes of relevance for women with GDM and their babies for many of the comparisons in this overview comparing treatment interventions for women with GDM.

- **Jclin Med – (2022) –** The main problem of overweight and obesity around the world significantly contributes to the steady increase in the incidence of diabetes including GDM in the population of women of reproductive age.

- **Wenrui Ye (25 May 2022) –** This systematic review and meta-analysis showed that in studies where insulin was not used, when adjusted for con founders**,** women with Gestational diabetes mellitus had increased odds of caesarean delivery, preterm delivery, macrosomia, and an infant large for gestational age in the pregnancy outcomes.

- **Robert Hodzelewski – (5 Aug 2022) –** Done a review on GDM which is one of the most common complications of pregnancy and confers lifelong risk to both mother and their children observational data demonstrated a linear associate on between maternal glycaemic parameters and risks for adverse pregnancy and offspring outcomes.

- **D Hrwill Gajena – (2 May 2023) –** With the current amount of knowledge, GDM can be addressed as a multifactorial and complex process that can evolve from various mechanisms. Diabetes in developing and developed nations is on the rise and leading up to become an epidemic, the prevalence of GDM is increasing in population worldwide.

- **Dhruvil Grajera (2023) –** Done a detailed review on Gestational Diabetes Mellitus with Emphasis on pathophysiology, epidemiology, related risk factors. With the current amount of knowledge, GDM can be addressed as a multifactorial and complex process that can evolve from various mechanisms.
  Diabetes in developing and developed nations is on a rise and leading up to become an epidemic. Screening of diabetes antepartum provides an insight into the women's future risk of diabetes. GDM leads to poor consequences on the health of the mother and offspring as well. Half of the women are not aware of their glucose intolerance until they have their pregnancy and glucose screening inform them about it, also with early intervention , proper treatment , and diet many of the short term and long term effects of GDM can be avoided.

- **Problems to be investigated.**

  As number of Gestational Diabetes Mellitus cases increasing day by day in pregnant women of 25-45 age group. It is the most common medical complication of pregnancy globally. Detecting it at an earlier stage is important to reduce cases of future type 2 diabetes, obesity, and cardiovascular disease in mothers.

- **Objective**

  The main objectives of the study are as follow: -

  - To study the socio-economic status of women with Gestational Diabetes Mellitus.
  - To find out the reasons behind the onset of Gestational Diabetes Mellitus.
  - To assess dietary habits and lifestyle management of Gestational Diabetic women.

- **Motivation**

  As the cases of Diabetes increase day by day also, I am handling Gestational Diabetes Mellitus patients every day. Made me think to bring change and awareness in them about the onset of this condition and the management of lifestyle, the eating habits and insulin, so that they can be educated for this period of Gestation. Hence, in this way I get motivated to do research on it.

- **Research Questions**

The research questions are: -

- 1.What is the Socioeconomic status of women diagnosed with GDM?
- 2.What are the reasons behind the onset of GDM?
- 3.How do dietary habits correlate with blood glucose levels and insulin requirements among women?
- 4.How do healthcare professionals in Ranchi town support and educate pregnant women with GDM regarding dietary management and insulin therapy?

❖ Research Design and Methodology

The research is exploratory research design, where I will research the impact of dietary, lifestyle and Insulin effect on GDM patients.

- a) **Selection of the field**: - 5 private clinics of Ranchi town will be selected. The study will be conducted on 200 females belonging to age group of 25-45 years, attending OPD during pregnancy, along with high levels of FDG, PPG and HbA1C.

- B) **Sampling technique**: - The data is collected through convenient sampling

❖ Inclusion Criteria: -

a) Pregnant females aged 25-45 years.
b) Pregnant females who are having symptoms after pregnancy test of increased blood sugar level than the normal after pregnancy.

❖ Exclusion Criteria: -

a) Pregnant females below 25 years and above 45 years of age were excluded from the study.
b) Respondents who are unable to participate.
c) Respondents who are diabetic before pregnancy.

❖ Tools and Techniques to be used in collection of Data:

a) By using a self-prepared structured schedule.
b) Measuring weight by using a weighing machine.

c) Measuring height by using height scale.
d) Laboratory investigation (from existing lab report of the patients)

❖ **Parameters and Procedure:**

Dependent Variables
• Height • Weight • BMI • Bio-chemical test

Independent Variables
• Age • Religion • Dietary Pattern • Awareness • Education level • Type of Family • Family Income

a) **DIETARY PROFILE:**

Parameter	Tools to be used
Food Intake pattern (Regular Basis)	Oral history (24 hrs dietary recall

b) **PHYSICAL ACTIVITY STATUS:**

Parameter	Tools to be used
Physical Activity level	Oral history

c) **BIOCHEMICAL REPORTS: -**

Parameter	Tools to be used
FBG PBG HbA1C	From existing reports of respondents.

d) **ANTHROPOMETARY MEASUREMENT: -**

Parameter	Tools to be used
Height	Height Scale
Weight	Weighing machine
Body Mass Index	Using BMI's formula i.e. weight in kg/height in m^2

e) **BIOPHYSICAL**

Parameter	Tools to be used
Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP)	Standardized sphygmomanometer

❖ **Significance of the study: -**

- Many individuals are still unaware about the results of Gestational Diabetes Mellitus, being a part of pregnancy. The discovering study will benefit society in the following.
- Will make aware the females about Gestational diabetes Mellitus and its outcomes.
- Early recognition of Gestational Diabetes Mellitus will help with minimum adverse events.
- Will help in covering individuals about how a dietary and lifestyle change is important in Gestational Diabetes Mellitus.
- Will handhold the patient regarding insulin management during their Gestational period.
- Will help to control further complications.

❖ **Relevance of the study to the present day problem and need of the society: -**

In the current scenario due to the lifestyle, the food choices people are more prone to metabolic disorder which is bringing them closer to some kind of disease. Pregnancy is the most beautiful journey for any female, but due to some metabolic disorder it gets a little difficult for them. So, the proper management of lifestyle and medication and education become necessary for them.

❖ **Contribution to the existing knowledge**: -

Research will be conducted in the Ranchi town for the first time, and this will surely bring some changes in the Gestational Diabetes Mellitus patients journey and help them for further presentation.

❖ **Future Work: -**

Studies can be done to favor whether the Gestational Diabetic women have inherited the disorder from their parents.

Conducting in depth study of any more metabolic disorder such as Thyroids can be carried forwarded. Investigating the after-delivery health of the mothers along with the child can be performed. Maternal obesity is also a vast topic to be carried forwarded for further study.

❖ **Limitations of the Research: -**

1. **Sampling Bias: -**

The sample may not be representation of all GDM women, as the collection of data is limited to specific geographic location.

2. **Self – Reported Data: -**

The 24 has dietary recall after relying on Self-reported data, which can be subject to recall bias or misreporting. Participants may overestimate or underestimate food intake, leading to inaccuracies in the assessment of dietary patterns lifestyle management.

3. **Limited scope of Dietary Assessment: -**

Although dietary assessment is done by 24 hours recall food style, lifestyle and food frequency method maybe it can fail to capture the full range of nutrients consumed.

4. **Social-Desirability Bias: -**

Participants may provide responses that they perceive as socially desirable rather than accurate, especially when reporting on their dietary habits. This would lead to an overestimation of healthy food choices and misunderstanding of rest healthy behaviour.

❖ **Tentative Chapterisation:-**

- **Chapter 1 – Introduction**
  - **Objective**

- **Chapter 2 - Review of Literature**
- **Chapter 3 – Research Design and Methodology**
- **Chapter 4 – Result and Discussion**
- **Chapter 5 – Conclusion and Suggestion.**

5. <u>References</u>: -

1. Vounzoulaki, E. et al. Progression to type 2 diabetes in women with a known history of gestational diabetes: systematic review and meta-analysis. BMJ 369, m1361 (2020).
2. Metzger, B. E. et al. Hyperglycemia and adverse pregnancy outcomes. N. Engl. J.Med. 358, 1991- 2002 (2008).
3. Crowther, C. A. et al. Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. N. Engl. J. Med. 352, Pg. 2477– Pg. 2486 (2005).
4. Powe, C. E., Hivert, M. F. & Udler, M. S. Defining heterogeneity among women with gestational diabetes mellitus. Diabetes 69, Pg.2064 – Pg.2074 (2020).
5. Powe, C. E. et al. Heterogeneous contribution of insulin sensitivity and secretion defects to gestational diabetes mellitus. Diabetes Care 39, Pg.1052 – Pg.1055.
6. Benhalima, K. et al. Characteristics and pregnancy outcomes across gestational diabetes mellitus subtypes based on insulin resistance. Diabetologia 62, Pg.2118 – Pg.2128 (2019).
7. Madsen, L. R. et al. Do variations in insulin sensitivity and insulin secretion in pregnancy predict differences in obstetric and neonatal outcomes? Diabetologia 64, Pg.304 – Pg.312 (2021).

8. Harrison, R. K., Cruz, M., Wong, A., Davitt, C. & Palatnik, A. The timing of initiation of pharmacotherapy for women with gestational diabetes mellitus. BMC Preg, Childbirth 20, 773 (2020).

9. Tisi, D. K., Burns, D. H., Luskey, G. W. & Koski, K. G. Fetal exposure to altered amniotic fluid glucose, insulin, and insulin-like growth factor-binding protein 1 occurs before screening for gestational diabetes mellitus. Diabetes Care 34, Pg.139 – Pg.144 (2011).

10. https://www.nature.com/articles/s41572-019-0098-8#:~:text=Carrington%2C%20E.%20R,B161%E2%80%93B167%20(1998).

11. https://www.nature.com/articles/s41572-019-0098-8#:~:text=World%20Health%20Organization,2592%E2%80%932593%20(2005).

12. Office guide to diagnosis and classification of diabetes mellitus and other categories of glucose intolerance.

13. Diagnosis and classification of diabetes mellitus.

14. Classification and diagnosis of diabetes mellitus.

15. New classification and criteria for diabetes: moving the goalposts closer.

16. Recent advances in diabetes mellitus of interest to dentistry.

17. https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/159-idf-diabetes-atlas- ninth-edition-2019.html